ABSTRACT

NEURAL PLASTICITY IN RESPONSE TO INTERVENTION IN ADOLESCENTS WITH AUTISM SPECTRUM DISORDERS

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Current theories of Autism Spectrum Disorders (ASD) suggest that they may be developmental in nature, emerging from the transactional interaction between biological risk factors and environmental processes, particularly attention and exposure to the social world (Dawson et al., 2009). Due to its experience-expectant nature, an individual’s degree of social exposure may have a significant impact on their brain’s development and subsequent behavioral presentation. While a primary critical neurodevelopmental period has been identified during the early childhood years, recent research has also demonstrated a second period of substantial neurodevelopment during the adolescent period (Sisk & Foster, 2004). This study investigated the neural and behavioral impact of participation in an empirically validated behavioral intervention (The Program for the Education and Enrichment of Relational Skills; Laugeson & Frankel, 2010) during the adolescent years among individuals with ASD. Results indicated that prior to intervention adolescents with ASD (n=21) differed from their neurotypical peers (n=24) with regard to amount of EEG spectral power across brain locations within the theta and beta frequency bands but not the delta, alpha or gamma frequency bands. Participation in the intervention resulted in increased EEG power in both frequency bands to a degree rendering adolescents with ASD statistically indiscernible from their typically developing peers. Waitlist control subjects (n=22), in contrast, continued to differ statistically from their neurotypical peers at the time of follow-up assessment. Behavioral change also was observed in response to the intervention, namely increased social exposure and social skills knowledge. No direct correlations could be drawn, however, between neural and behavioral outcomes, suggesting the presence of mediating factors not examined here. A secondary aim of the study was to examine new EEG methodology. Standard continuous EEG procedures complete data collection with subjects in a resting state with no stimuli present. A novel condition was implemented in this study involving video and audio presentation of a neurotypical peer providing autobiographical information normally shared in social settings. The goal of including this condition was to enhance our understanding of the meaning of EEG abnormalities in the ASD population, particularly their implications for social information processing; however, no differences were noted between subjects with and without ASD during the novel condition that were not observed in the resting state condition. Taken together, results suggest continued use of standard EEG procedures in the assessment of neurodevelopment in ASD. They also point to adolescence as a crucial period of neural and behavioral development sensitive to behavioral intervention.